

25 May 2018

OUR REF: 476088 - 01000

Roderick Lahey Architect Inc.
56 Beech Street
Ottawa, ON K1S 3J6

Attention: Robert Verch

Dear Rob:

**Re: 929 Richmond Road Transportation Impact Assessment
Addendum #1**

1. INTRODUCTION

The Transportation Impact Assessment (TIA) for the proposed residential development located at 929 Richmond Road was submitted in December 2017. Comments have been received on the TIA from the City of Ottawa and the Site Plan has been revised. This Addendum #1 has been prepared to address the City's transportation comments. The revised Site Plan is included as Attachment #1.

2. CITY COMMENTS

2.1. TRAFFIC SIGNALS

Comment 6: *No comments to Transportation Impact Assessment circulation. Traffic Signal Design and Specification reserves the right to make future comments based on subsequent submissions.*

Response 6: Noted and the proponent has been advised.

Comment 7: *Future considerations:*

- a. *If there are any future proposed changes in the existing roadway geometry for the purpose of construction of a new TCS(s) or modifications to existing TCS(s) the City of Ottawa Traffic Signal Design and Specification Unit is required to complete a review for traffic signal plant re-design and provide the actual re- design.*
- b. *If the proposed traffic signals are warranted/approved for installation or modifications to existing TCS are approved, and RMA approved, please forward an approved geometry detail design drawings (dwg digital format in NAD 83 coordinates) including base mapping, existing and new underground utilities/sewers, new/existing catch basins locations, Turn-Radius Modeling and approved pavement markings drawings in separate files for detail traffic plant design lay out.*

Response 7: Noted and the proponent has been advised.

Comment 8: *Please send all digital (CADD) design files to Peter.Grajcar@ottawa.ca 613-580-2424 extension 23035.*

Response 8: Noted and the proponent has been advised.

Comment 9: As per new building; there is existing underground and above ground traffic plant in the area of future construction activity (i.e., NW quadrant) location. Underground traffic plant and traffic signal hardware is to be maintained, protected and fully accessible at all times during construction.

Response 9: Noted and the proponent has been advised.

Comment 10: The grades of new (looks like interlock/stones) sidewalk in the area of existing traffic pole are not to change. The proponent of the project and its contractor are responsible for all the costs associated with reinstatement of potential damages to existing underground and above ground traffic infrastructure.

Response 10: Noted and the proponent has been advised.

2.2. TRAFFIC ENGINEERING

Comment 11: The access off Richmond Road is of particular concern especially since it is so close to the signalized intersection. Left turns into and out of this driveway for all vehicles should be prohibited. The option to signalize the driveway should not be considered. Inbound vehicles would likely have committed to turning into this access before having visibility of the signal thus becoming trapped. Moreover, having a signal would not eliminate blockages on Richmond Road because of vehicles wanting to enter. Option to use the area as a "truck court only" may be best solution if there is also space for trucks to turn around so they will not be backing out of the driveway to exit, (right out only).

Response 11: The driveway has been revised to provide a 6 m wide drive aisle to accommodate 2-way vehicle traffic. As this proposed driveway provides access to only 12 parking spaces, the vehicle volumes are projected to be low. The driveway is located approximately 25 m from Woodroffe Avenue, which meets the City's Private Approach By-Law requirements, however it is located approximately 10 m from the eastbound STOP bar at the Richmond/Woodroffe intersection. There is also a westbound bus stop located immediately west of the driveway and buses will occasionally block the driveway for a short period of time. As such, it is recommended that left turns into and out of the driveway be prohibited through either signage, the construction of on-site channelization (i.e. pork-chop), or the construction of a median along Richmond Road. The most appropriate solution will need to be compatible with the City's planned complete street design for Richmond Road.

Comment 12: The proposed changes to Richmond Road and Woodroffe Avenue show a bidirectional cross ride on the south side of the intersection. Under these circumstances the eastbound and westbound left turns will need to be fully protected movements. The Synchro model should reflect this and the queues that would be generated because of this change and storage requirements reviewed.

Response 12: The proposed changes to the Richmond Road and Woodroffe Avenue intersection are expected to be implemented in 2023 along with the Stage 2 LRT. As mentioned in the original TIA (Section 5.3), the site is expected to achieve high transit mode splits once Stage 2 LRT is in place. As such, the number of projected site-generated vehicle trips is low (in the range of 15 veh/h), which will have a negligible impact on vehicle performance for the future 2024 condition.

The SYNCHRO analysis for the background 2024 condition has been revised and the SYNCHRO model output is included as Attachment #2. As shown in the original TIA (Section 5.1.1), the Woodroffe/Richmond intersection is projected to operate above capacity (LoS 'F') during both the morning and afternoon peak hours. The critical eastbound through and westbound left-turn movements are projected to operate with v/c ratios of 1.29 and 1.37 during peak hours. As mentioned in the TIA, drivers can expect long delays and queues for this future condition. These queues and delays are increased with the fully-protected eastbound and westbound left-turn phases.

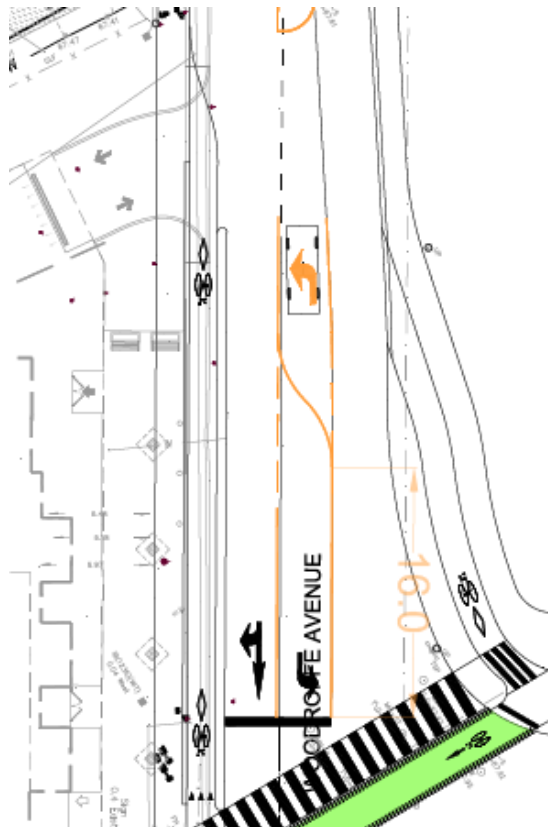
Comment 13: The southbound queues will block the access off Woodroffe Avenue. Vehicles waiting to turn left into the access will block Woodroffe Avenue traffic and resultant queues may block pedestrian crossing, cycle tracks, and

extend into the intersection. Was there any analysis completed for the site access to determine effect on through traffic?

Response 13: As outlined in the original TIA, there are approximately 20 veh/h projected to turn left into the site during the afternoon peak hour. There is a significant amount of queueing in the southbound direction on Woodroffe Avenue and we have been informed by the public that vehicles do not always leave gaps in traffic to allow left-turn movements along this corridor. It is noteworthy that the SYNCHRO analysis assumes that drivers leave gaps in the southbound queue and the northbound left-turn movement into the site operates acceptably in the SYNCHRO model. The following mitigative measures are offered to improve operations at the site driveway:

1. Provide pocket northbound left-turn lane at site driveway:
 - The existing southbound left-turn lane at the Richmond/Woodroffe intersection is approximately 30 m long plus taper. This option is to remove a portion of the southbound left-turn storage length and provide a short northbound left-turn lane at the site driveway. This will allow the northbound through movement on Woodroffe Avenue to flow freely even if there is a left-turning vehicle entering the site;
 - This proposed shortened left-turn lane configuration is illustrated below and provided as Attachment #3.

Figure 1: Proposed Pocket Northbound Left-Turn Lane at Site Driveway



- As shown, if a 16m southbound left-turn lane is provided at the Richmond/Woodroffe intersection then short pocket left-turn storage lane could be accommodated at the site driveway. There are approximately 30 to 50 southbound left-turning vehicles per hour at the Richmond/Woodroffe the morning and afternoon peak hours. According to TAC guidelines, this amount of traffic warrants a 14m storage lane (assuming the existing 100 second cycle length). The southbound left-turn phase is permitted (i.e. no advance left-turn arrow). This option allows the northbound left-turn movement into the site without impacting the northbound traffic flow along Woodroffe Avenue.
2. Provide left-turn movement restriction during peak hours:
 - Restricting the left-turn movement into the site during peak hours could be implemented by signage. As there is no median on Woodroffe Avenue, the signage would be located on-site and not immediately

visible to drivers attempting to turn left into the site. As such, it is likely there would be minimal compliance for this turn restriction;

- In addition, northbound vehicle wishing to access the site may use private driveways or local roadways to turn around on Woodroffe Avenue and head south towards the site. Regardless of a turn restriction, many vehicles from the south destined to the site will turn left along Woodroffe Avenue, either at the site driveway or further north. Driver may also opt to cut through the adjacent Indian restaurant site (located east of Woodroffe) and travel from the eastern site straight through into the subject site (performing a westbound through movement).
 - A northbound left-turn restriction is not recommended due to the likelihood of compliance issues and the alternative options for drivers to turn around via private driveways and local streets.
3. Allow full-movement access with no turn lane or restrictions.
- Significant vehicle volume reductions are required within this area for the future 2024 operations of the transportation network. If these reductions in vehicle traffic are not achieved, drivers will experience significant delays and queues in the study area unrelated to the site.
 - With the forecasted requirement for vehicle volume reduction, the queues along Woodroffe Avenue may be reduced and southbound drivers along Woodroffe Avenue may leave appropriate gaps in queues for vehicles to access the site with minimal delays and queues.

2.3. STREET LIGHTING

Comment 14: *Privately owned light bollards, (item 38 of the provided site plan) are not to extend into the city's right of way.*

Response 14: Noted and the architect has been advised.

Comment 15: *No further comment at this time. We reserve the right to make further comments based on subsequent submissions.*

Response 15: Noted and the proponent has been advised.

2.4. TRANSPORTATION ENGINEERING SERVICES

Comment 16: *The southbound volumes on Woodroffe Avenue are high in peak and off-peak hours. Consider peak hour restrictions to both accesses.*

Response 16: Residents of the site will require access to their parking at all times of the day. It is assumed that this comment is recommending a northbound left-turn restriction into the site during peak hours. This restriction is discussed in Response 13 above.

Comment 17: *Since the development falls under transit-oriented development area, consider reducing the number of parking spaces to the required car parking space by zoning bylaw.*

Response 17: It is our understanding that the number of parking spaces provided was determined based on market demand. The total number of spaces proposed is 148 spaces, which included 132 resident parking spaces and 16 visitor parking spaces. This amount of resident parking equates to 0.8 spaces per unit and does not exceed the City's By-Law maximum number of parking for areas within close proximity to transit.

As the City invests in transit infrastructure, transit modal shares are expected to increase during peak commuter periods. Residents of this site may want to own a car but may travel via transit or active modes during commuter peaks. Outside the peak hours, the residents may use their car for errands, activities, and/or travel outside of town.

Comment 18: *Please ensure that the sidewalks on the frontage of Richmond Road and Woodroffe Avenue are up to City standards.*

Response 18: Noted and the architect has been advised.

Comment 19: *The full movement access on Richmond Road does not meet the minimum 6.7 m width.*

Response 19: The driveway width of the access to Richmond Road has been revised to 6 m, as shown on the attached Site Plan.

Comment 20: *Underground ramps should be limited to a 12% grade and must contain a subsurface melting device when exceeding 6%.*

Response 20: Noted and the architect has been advised.

2.5. DEVELOPMENT REVIEW – TRANSPORTATION ENGINEERING SERVICES

Comment 21: *Accessible parking has not been provided.*

Response 21: Noted and the architect has been advised.

Comment 22: *The design does not match the complete street plan prepared by the City.*

Response 22: Noted and the architect has been advised.

Comment 23: *Westbound bus stop on Richmond has not been identified. This stop will have to be relocated as part of this development.*

Response 23: The need to relocation of the bus stop is related to the decision regarding the functionality/design of the Richmond Road driveway. See Response 11.

Comment 24: *Full road detail including pavement marking details for Richmond and Woodroffe are required.*

Response 24: Noted and the architect has been advised.

Comment 25: *More detail required to the corner of Richmond and Woodroffe; corner radii, TWSI detail and dimension.*

Response 25: Noted and the architect has been advised.

Comment 26: *Sidewalk width required.*

Response 26: Noted and the architect has been advised.

Comment 27: *Placement of bicycle racks will impede pedestrian circulation. They must also be dimensioned as per Part 4 – Parking, Queuing and Loading Provisions of the Zoning By-law.*

Response 27: Noted and the architect has been advised.

Comment 28: *Will depressed curbs will be required to access Garbage room?*

Response 28: Yes and they are provided.

PARSONS

Comment 29: Depressed curbs required in the parking lot to access the sidewalk/building.

Response 29: Noted and the architect has been advised.

Comment 30: How will deliveries/tenant move-ins be accommodated?

Response 30: Small deliveries will come through the main entry. Large deliveries and tenant move-ins will be coordinated with building administration and come in through a corridor at the rear of the building adjacent to the garbage room.

Comment 31: Provide truck turning templates for the large vehicle accessing the site.

Response 31: Truck turning templates for Heavy Single Unit (HSU) trucks is provided as Attachment #4.

Comment 32: Deliveries and/or tenant move-ins cannot be accommodated on the streets.

Response 32: Noted. Deliveries and/or tenant move-ins will be accommodated within the parking lot with access to Richmond Road.

Based on the foregoing, provided the Richmond Road access is designed as a right-in/right-out only, the proposed 929 Richmond Road development continues to be recommended from a transportation perspective.

Prepared by:



André Sponder, P.Eng.
Transportation Engineer

Reviewed by:



Mark Baker, P.Eng.
Senior Project Manager



Attachment #1

Revised Site Plan



















PROJECT INFORMATION		
ZONING	Zoning By-Law 2017-113	TM(1935) H(47)
SITE AREA	2,357.84 sq. m. (25,380) sq. ft.	
BUILDING HEIGHT	47.0 M	
PROJECT STATISTICS		
BUILDING HEIGHT	64.1 M	
AVERAGE MEAN GRADE	(GEO. ELEV.) 68.00	
GROSS BUILDING - AREAS (CITY OF OTTAWA'S DEFINITION)		
PARKING LEVELS (4 LEVELS U/G)	2,240 sq. m. (24,110) sq. ft.	N/A
GROUND FLOOR	525.4 sq. m. (5,655) sq. ft.	
2nd to 4th FLOOR	3 x 895.5 sq. m. 3 x (9,639) sq. ft.	2,686.5 sq. m. (28,917) sq. ft.
5th to 14th FLOOR	10 x 613.9 sq. m. 10 x (6,608) sq. ft.	6,139.0 sq. m. (66,080) sq. ft.
15th to 18th FLOOR	4 x 512.3 sq. m. 4 x (5,514) sq. ft.	2,049.1 sq. m. (22,056) sq. ft.
19th FLOOR	504.6 sq. m. (5,432) sq. ft.	
AMENITY FLOOR	251.6 sq. m. (2,705) sq. ft.	N/A
MECHANICAL FLOOR	251.6 sq. m. (2,705) sq. ft.	N/A
TOTAL AREA	11,904.5 sq. m. (128,139) sq. ft.	
UNIT STATISTICS		
1 BEDROOM UNIT	88	
2 BEDROOM UNIT	78	
TOTAL	166	
COMMERCIAL RETAIL	300.0 sq. m. (3,230) sq. ft.	
AMENITY AREA		
EXTERIOR COMMUNAL AT GRADE	190.0 sq. m. 2,045 sq. ft.	
EXTERIOR PRIVATE AT GRADE	51.3 sq. m. 552 sq. ft.	
20th FLOOR COMMUNAL AMENITY ROOM	230.9 sq. m. 2,480 sq. ft.	
20th FLOOR COMMUNAL ROOF TOP PATIO	190.6 sq. m. 2,052 sq. ft.	
PRIVATE BALCONIES	754.1 sq. m. 8,117 sq. ft.	
TOTAL =	1,416.9 sq. m. 15,251 sq. ft.	
REQUIRED (172 UNITS X 6 m²) = 1,032 m² / 11,108 ft²		

CAR PARKING		
REQUIRED by ZONING BY-LAW		
RESIDENCE	- 0.5 PER UNIT (166 UNITS)	83
VISITOR	- 0.1 PER DWELLING UNIT (AFTER 12 UNITS)	15
COMMERCIAL RETAIL (RETAIL FOOD, BANK & CONVENIENCE STORE)	- 2.5 PER 100m² OF G.F.A. (AFTER 150m²)	0
TOTAL		98
PROVIDED 4 LEVELS		
RESIDENCE	- 0.80 PER UNIT (166 UNITS)	132
VISITOR	- 0.1 PER DWELLING UNIT (AFTER 12 UNITS)	16
COMMERCIAL RETAIL (RETAIL FOOD, BANK & CONVENIENCE STORE)	- 2.5 PER 100m² OF G.F.A. (AFTER 150m²)	0
TOTAL		148
BICYCLE PARKING		
REQUIRED		
RESIDENCE	- 0.5 PER UNIT (166 UNITS)	83
COMMERCIAL RETAIL	- 1.0 PER 250m² OF G.F.A.	2
TOTAL		85
PROVIDED		
EXTERIOR		4
UNDERGROUND PARKING LEVEL		180
TOTAL		184
LOT COVERAGE		
PAVED SURFACE =	556.6 sq. m.	23.6%
BUILDING FOOTPRINT =	1,073.0 sq. m.	45.5%
LANDSCAPE OPEN SPACE =	728.2 sq. m.	30.9%
TOTAL =	2,357.8 sq. m.	100.0%

Attachment #2

Revised SYNCHRO Analysis

Background 2024 AM
1: Woodroffe & Richmond

								
Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations								
Traffic Volume (vph)	157	765	64	237	121	266	40	341
Future Volume (vph)	157	765	64	237	121	266	40	341
Lane Group Flow (vph)	174	1099	71	286	134	402	44	449
Turn Type	Prot	NA	Prot	NA	pm+pt	NA	Perm	NA
Protected Phases	5	2	1	6	3	8		4
Permitted Phases					8		4	
Detector Phase	5	2	1	6	3	8	4	4
Switch Phase								
Minimum Initial (s)	5.0	10.0	5.0	10.0	5.0	10.0	10.0	10.0
Minimum Split (s)	12.6	26.6	12.6	26.6	10.3	23.9	23.9	23.9
Total Split (s)	22.8	52.1	12.6	41.9	10.3	35.3	25.0	25.0
Total Split (%)	22.8%	52.1%	12.6%	41.9%	10.3%	35.3%	25.0%	25.0%
Yellow Time (s)	3.3	3.3	3.3	3.3	3.3	3.3	3.3	3.3
All-Red Time (s)	4.3	4.3	4.3	4.3	2.0	3.6	3.6	3.6
Lost Time Adjust (s)	-3.6	-3.6	-3.6	-3.6	0.5	-2.9	-2.9	-2.9
Total Lost Time (s)	4.0	4.0	4.0	4.0	5.8	4.0	4.0	4.0
Lead/Lag	Lead	Lag	Lead	Lag	Lead		Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes		Yes	Yes
Recall Mode	None	C-Max	None	C-Max	None	None	None	None
Act Effct Green (s)	17.2	50.6	8.6	39.5	29.5	31.3	21.0	21.0
Actuated g/C Ratio	0.17	0.51	0.09	0.40	0.30	0.31	0.21	0.21
v/c Ratio	0.60	1.26	0.49	0.41	0.88	0.75	0.31	1.22
Control Delay	46.9	150.9	55.7	24.3	79.7	39.5	40.6	155.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	46.9	150.9	55.7	24.3	79.7	39.5	40.6	155.1
LOS	D	F	E	C	E	D	D	F
Approach Delay		136.7		30.5		49.6		144.9
Approach LOS		F		C		D		F
Queue Length 50th (m)	30.8	~277.0	13.4	39.7	19.8	66.5	7.3	~106.5
Queue Length 95th (m)	51.9	#353.2	27.3	62.2	#50.6	#102.7	17.7	#165.7
Internal Link Dist (m)		206.7		191.0		115.7		120.6
Turn Bay Length (m)	80.0		80.0		38.0		35.0	
Base Capacity (vph)	318	874	145	692	152	536	140	369
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.55	1.26	0.49	0.41	0.88	0.75	0.31	1.22

Intersection Summary

Cycle Length: 100

Actuated Cycle Length: 100

Offset: 0 (0%), Referenced to phase 2:EBT and 6:WBT, Start of Green

Natural Cycle: 120

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 1.26

Intersection Signal Delay: 106.4

Intersection LOS: F

Intersection Capacity Utilization 106.3%

ICU Level of Service G

Analysis Period (min) 15









~ Volume exceeds capacity, queue is theoretically infinite.

Queue shown is maximum after two cycles.

















95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

Splits and Phases: 1: Woodroffe & Richmond

			
Ø1	Ø2 (R)	Ø3	Ø4
12.6 s	52.1 s	10.3 s	25 s
			
Ø5	Ø6 (R)	Ø7	Ø8
22.8 s	41.9 s	35.3 s	

Background 2024 PM
1: Woodroffe & Richmond

								
Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations								
Traffic Volume (vph)	86	333	225	649	240	416	26	352
Future Volume (vph)	86	333	225	649	240	416	26	352
Lane Group Flow (vph)	96	571	250	757	267	563	29	462
Turn Type	Prot	NA	Prot	NA	pm+pt	NA	Perm	NA
Protected Phases	5	2	1	6	3	8		4
Permitted Phases					8		4	
Detector Phase	5	2	1	6	3	8	4	4
Switch Phase								
Minimum Initial (s)	5.0	10.0	5.0	10.0	5.0	10.0	10.0	10.0
Minimum Split (s)	12.6	26.6	12.6	26.6	10.3	23.9	23.9	23.9
Total Split (s)	12.6	38.0	19.0	44.4	14.0	43.0	29.0	29.0
Total Split (%)	12.6%	38.0%	19.0%	44.4%	14.0%	43.0%	29.0%	29.0%
Yellow Time (s)	3.3	3.3	3.3	3.3	3.3	3.3	3.3	3.3
All-Red Time (s)	4.3	4.3	4.3	4.3	2.0	3.6	3.6	3.6
Lost Time Adjust (s)	-1.4	-1.4	-1.4	-1.4	-0.4	-0.3	-0.3	-0.3
Total Lost Time (s)	6.2	6.2	6.2	6.2	4.9	6.6	6.6	6.6
Lead/Lag	Lead	Lag	Lead	Lag	Lead		Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes		Yes	Yes
Recall Mode	None	C-Max	None	C-Max	None	None	None	None
Act Effct Green (s)	6.4	31.8	12.8	38.2	38.1	36.4	22.4	22.4
Actuated g/C Ratio	0.06	0.32	0.13	0.38	0.38	0.36	0.22	0.22
v/c Ratio	0.89	1.05	1.16	1.12	1.17	0.89	0.26	1.18
Control Delay	109.1	84.7	150.7	103.2	137.8	48.1	39.2	138.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	109.1	84.7	150.7	103.2	137.8	48.1	39.2	138.2
LOS	F	F	F	F	F	D	D	F
Approach Delay		88.2		115.0		77.0		132.3
Approach LOS		F		F		E		F
Queue Length 50th (m)	18.8	~117.0	~57.4	~170.1	~46.0	99.7	4.7	~106.8
Queue Length 95th (m)	#48.6	#181.2	#104.0	#240.1	#94.8	#162.1	13.2	#166.8
Internal Link Dist (m)		206.7		191.0		115.7		120.6
Turn Bay Length (m)	80.0		80.0		38.0		35.0	
Base Capacity (vph)	108	545	216	676	229	630	111	393
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.89	1.05	1.16	1.12	1.17	0.89	0.26	1.18

Intersection Summary

Cycle Length: 100

Actuated Cycle Length: 100

Offset: 0 (0%), Referenced to phase 2:EBT and 6:WBT, Start of Green

Natural Cycle: 120

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 1.18

Intersection Signal Delay: 101.3

Intersection LOS: F

Intersection Capacity Utilization 102.8%

ICU Level of Service G

Analysis Period (min) 15

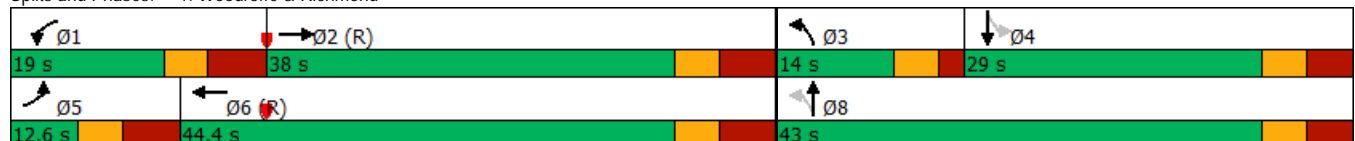
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Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.

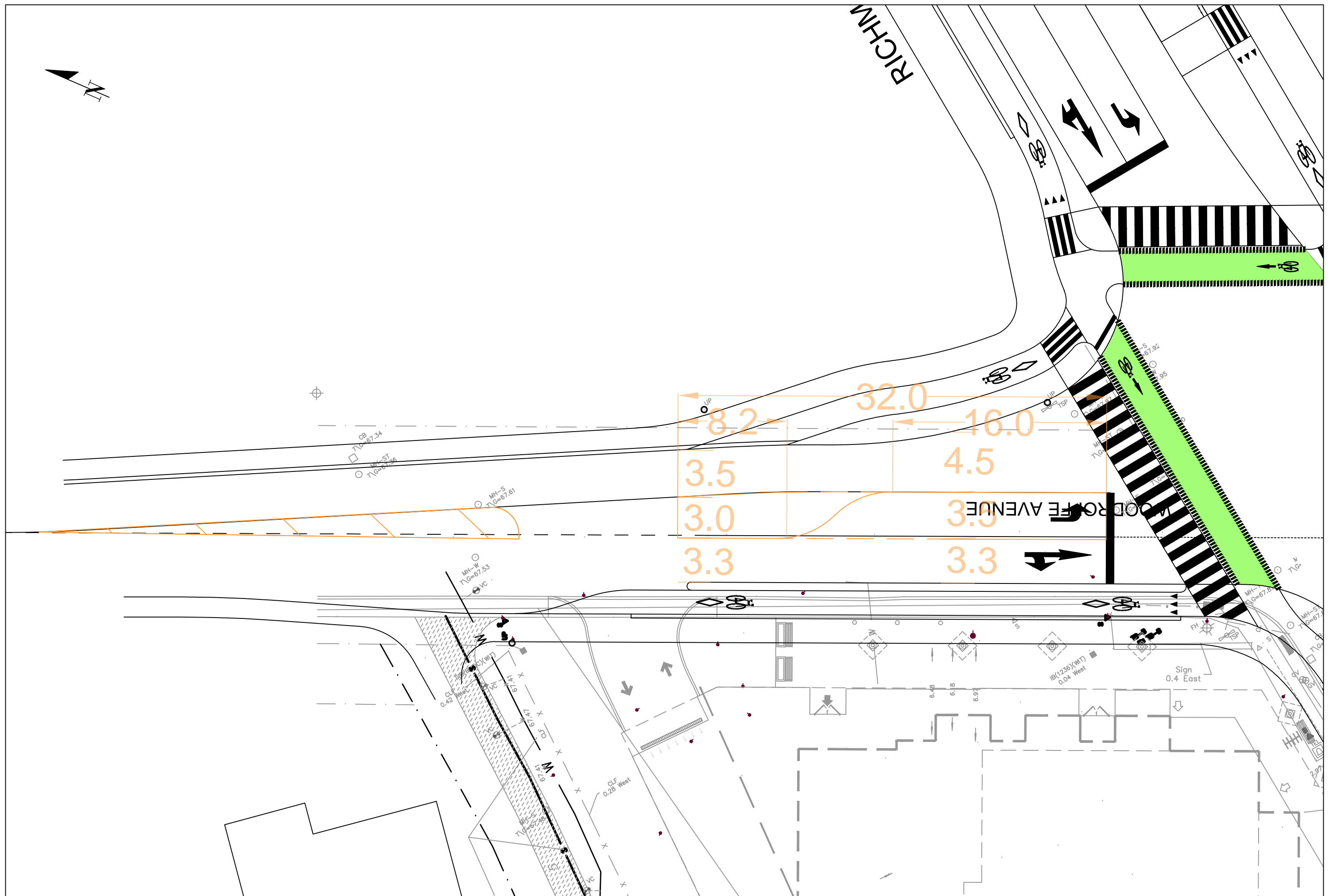
Queue shown is maximum after two cycles.

Splits and Phases: 1: Woodroffe & Richmond



Attachment #3

Proposed Left-Turn Alignment



Attachment #4

Truck Turning

